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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,717	09/16/2005	Zhinong Ying	9342-81	7930

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MYERS BIGEL SIBLEY & SAJOVEC
PO BOX 37428
RALEIGH, NC 27627

EXAMINER	
KARACSONY, ROBERT	
ART UNIT	PAPER NUMBER
2821	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

TH

Office Action Summary	Application No.	Applicant(s)	
	10/549,717	YING, ZHINONG	
	Examiner	Art Unit	
	Robert Karacsony	2821	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to amendments received August 17, 2007. Claims 1-23 are pending.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 5-8, 11-16 and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagisawa et al. (US 6,369,762; hereafter Yanagisawa) in view of Hikuma et al. (US 6,104,356; hereinafter Hikuma).

Claim 1: Yanagisawa teaches a diversity radio antenna comprising,

A ground substrate (1),

First and second elongated antenna elements (3a & 3b), each extending between respective first and second opposing ends thereof in a plane parallel to and spaced from the ground substrate (Fig. 1A), and

An excitation electrode (2) interposed between the respective first ends (Fig. 1A), each antenna element having one grounding point connectable to the ground substrate (Fig. 1A; Abstract).

Yanagisawa fails to teach the first antenna element has a first ground connector switch means selectively connecting or disconnecting the first antenna grounding point to the ground substrate, and the second antenna element has a second ground connector switch means

selectively connecting or disconnecting the second antenna grounding point to the ground substrate, wherein said ground connector switch means are configured to selectively connect one or both of said antenna elements to the ground substrate for controlling radiation beam pattern and polarization diversity of the antenna. However, Hikuma teaches a diversity antenna which alleviates the effects of fading (col. 1/lines 25-26) by switching between two antenna elements by turning ON/OFF switches which are arranged between each antenna element and ground (Fig. 1; col. 4/lines 17-28). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the teachings of Hikuma with the invention of Yanagisawa and switched between the antenna elements in order to have alleviated the effects of fading.

Claim 2: Yanagisawa teaches that the grounding points are configured at the respective second ends of the first and second antenna elements (Fig. 1A).

Claim 3: Yanagisawa teaches that the first and second antenna elements extend substantially perpendicular to each other in the plane (Fig. 1A).

Claim 5: Yanagisawa teaches that the excitation electrode is capacitively coupled to the respective first ends of the first and second antenna elements (Abstract).

Claim 6: Yanagisawa teaches the ground connector switch means are configured to connect the first and second antenna elements to ground (Fig. 1A), for adapting the antenna to a circularly-polarized radio wave (col. 2/lines 62-67 through col. 3/line 1).

Claim 7: If the modifications to the invention of Yanagisawa were made, as discussed above, one with ordinary skill in the art would realize the ground connector switch means are configured to connect one of the first and second antenna elements to ground, and disconnect the

other of the first and second antenna elements from ground for adapting the antenna to a linearly-polarized radio wave (Since the two antennas of Yanagisawa are orthogonal to each other, switching between the two antennas will obtain both vertical and horizontal polarization).

Claim 8: Claim 8 is similar in scope as claims 6 and 7 and is therefore rejected for substantially the same reasons.

Claim 11: Yanagisawa teaches that each of the first and second antenna elements have an electrical length of one quarter of a predetermined radio frequency wavelength (col. 3/lines 5-7).

Claim 12. Yanagisawa teaches a dielectric member (6) is interposed between the plane and the ground substrate (Fig. 1A).

Claim 13: Yanagisawa teaches that the dielectric member is made of a ceramic material (col. 5/lines 24-25).

Claim 14: Yanagisawa teaches that the antenna elements and the excitation electrode are provided on a first surface of the dielectric member, whereas the ground substrate is formed adjacent to a second surface of the dielectric member, opposite and parallel to the first surface (col. 5/lines 10-14).

Claim 15: Yanagisawa teaches that the antenna elements and the excitation electrode are formed by a coat of an electrically conductive material provided on the first surface, whereas a first and second spacing between the excitation electrode and the first and second antenna element, respectively, are formed by etching of the coat (col. 5/lines 10-21).

Claim 16: Yanagisawa teaches that a radio frequency feed conductor (5) extending from the excitation electrode along a side surface of the dielectric member, to a feed pad (4) at the second surface (col. 6/lines 33-46).

Claim 18: Yanagisawa teaches a radio communication terminal ('portable terminal', col. 9/lines 2-5) comprising a diversity radio antenna, the diversity radio antenna comprising:

A ground substrate (1),

First and second elongated antenna elements (3a & 3b), each extending between respective first and second opposing ends thereof in a plane parallel to and spaced from the ground substrate (Fig. 1A), and

An excitation electrode (2) interposed between the respective first ends (Fig. 1A), each antenna element having one grounding point connectable to the ground substrate (Fig. 1A; Abstract).

Yanagisawa fails to teach the first antenna element has a first ground connector switch means selectively connecting or disconnecting the first antenna grounding point to the ground substrate, and the second antenna element has a second ground connector switch means selectively connecting or disconnecting the second antenna grounding point to the ground substrate, wherein the ground connector switch means are configured to selectively connect one or both of the antenna elements to the ground substrate for controlling radiation beam pattern and polarization diversity of the antenna. However, Hikuma teaches a diversity antenna which alleviates the effects of fading (col. 1/lines 25-26) by switching between two antenna elements by turning ON/OFF switches which are arranged between each antenna element and ground (Fig. 1; col. 4/lines 17-28). Therefore, it would have been obvious to one of ordinary skill in the art at

the time the invention was made to have used the teachings of Hikuma with the invention of Yanagisawa and switched between the antenna elements in order to have alleviated the effects of fading.

Claim 19: Yanagisawa teaches an L-shaped dielectric member (Fig. 1A, 6) with substantially perpendicular legs (Fig. 1A) extending parallel (Fig. 1A) to the ground substrate and having a lower surface facing toward the ground substrate and an upper surface facing away from the ground substrate (Fig. 1A), wherein the first antenna element extends at the upper surface along one leg of the dielectric member (Fig. 1A) and the second antenna element extends at the upper surface along another leg of the dielectric member (Fig. 1A).

Claim 20: Yanagisawa teaches the excitation electrode is interposed in a gap separating the two antenna elements at an intersection of the dielectric member legs (Fig. 1A).

Claim 21: If the modifications to the invention of Yanagisawa were made, as discussed above, one with ordinary skill in the art would realize the ground connector switch means are configured to select vertical, horizontal (Since the two antennas of Yanagisawa are orthogonal to each other, switching between the two antennas will obtain both vertical and horizontal polarization) and circular polarization (col. 2/lines 62-67 through col. 3/line 1) of the antenna.

Claims 22 and 23 are similar in scope as claims 1 and 18, respectively, and are therefore rejected for substantially the same reasons.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagisawa in view of Hikuma as applied to claim 1 above, and further in view of Kurjenheimo et al. (US 2003/0076272, hereinafter Kurjenheimo).

Claim 4: Yanagisawa in view of Hikuma teaches all of the limitations of claim 1, as discussed above. They fail to teach a MEMS switch configured to control the switching action of each of the ground connector switch means. However, Kurjenheimo teaches using MEMS in a mobile device because of there very small physical size as compared to semiconductor switches [0041]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used MEMS as the switching means of Yanagisawa as taught by Kurjenheimo in order to have utilized there very small physical size.

5. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagisawa in view of Hikuma as applied to claim 1 above, and further in view of Kadambi et al. (US 2004/0056804, hereinafter Kadambi).

Claim 17: Yanagisawa in view of Hikuma teach all of the limitations of claim 1, as discussed above. They fail to teach the ground substrate is formed as a material layer in a printed circuit board. However, Kadambi teaches forming the ground plane on the PCB [0010] of a radio device in order reduce the size of the radio device [0016]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the ground plane of Yanagisawa on the PCB of the portable device, as taught by Kadambi, in order to have reduced the size of the portable device.

6. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagisawa in view of Hikuma as applied to claim 1 above, and further in view of Miyano et al. (US 7,212,164, hereinafter Miyano).

Claims 9 and 10: Yanagisawa in view of Hikuma fail to teach the ground connector switch means are configured to selectively connect the ground substrate to the antenna elements

over a predetermined inductive impedance. However, Miyano teaches shorting an antenna over an inductive load to adjust the resonance frequency (col. 7/lines 24-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the teachings of Miyano with the invention of Yanagisawa in order to have adjusted the resonance frequency of the antenna.

Response to Arguments

7. Applicant's arguments filed August 17, 2007 have been fully considered but they are not persuasive.

Regarding the arguments that "neither Hikuma nor Yanagisawa teach or suggest two antenna elements such that each antenna element includes a ground connector switch means for selectively connecting one or both of the antenna elements to a around substrate for controlling radiation beam pattern and polarization diversity of the antenna as recited in Claims 1 and 18. In fact, Hikuma teaches away from a combination with Yanagisawa". (see page 2, lines 3-7 of the Remarks)

Examiner notes that, Yanagisawa teaches that it is desirable to switch between polarizations enabling effective transmission/reception (col. 8/lines 34-49). Switching between polarizations is well known in the art as a means to alleviate fading effects, as taught by Hikuma (Abstract, col. 1/lines 25-26). Therefore, one with ordinary skill in the art would have been motivated at the time the invention was made to have combined the antenna structure of Yanagisawa with the method of switching between polarizations of Hikuma, since at the time the invention was made there was a need to provide switching between polarizations, i.e. polarization diversity, to achieve better transmission/reception.

If the modifications to the invention of Yanagisawa were made, as discussed above, one with ordinary skill in the art would have realized two antenna elements such that each antenna element includes a ground connector switch means for selectively connecting one or both of the antenna elements to a around substrate for controlling radiation beam pattern and polarization diversity of the antenna. Firstly, the claim limitation recites "selectively connecting one **or** both", which only requires one connection. Hikuma teaches each switch selectively connecting one of the antennas (col. 4/lines 18-28). Secondly, Yanagisawa already teaches the two antenna elements connected to ground to achieve circular polarization. After the combination of Yanagisawa and Hikuma, one with ordinary skill in the art would not replace this feature but instead add to it the switches of Hikuma, thus, enabling the combined antenna more versatile.

Regarding the arguments that "neither Hikuma nor Yanagisawa teaches or suggests a ground connector switch means configured to selectively connect/disconnect elements to ground to adapt the antenna to a circularly-polarized and/or linearly-polarized radio wave as recited in Claim 8 or to select vertical, horizontal or circular polarization of the antenna as recited in Claim 21". (see page 5, lines 8-12 of the Remarks) As discussed above in the Response to Arguments section, Yanagisawa in view of Hikuma do in fact teach these limitations. The features recited in claims 8 and 21 are inherent in the combined antenna structure. When both of the elements are grounded, circular polarization is achieved. When either of the two antenna elements are selected, linear (vertical or horizontal) polarization are achieved.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Karacsony whose telephone number is 571-270-1268. The examiner can normally be reached on M-F 7:30 am - 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas W. Owens can be reached on 571-272-1662. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RK RK

/Hoang V Nguyen/
Primary Examiner, AU 2821